

Written Testimony of
Robert P. Murphy, Institute for Energy Research
Before the
House Committee on Financial Services
On the Matter of
Oil Prices and the U.S. Dollar
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1. About IER: The Institute for Energy Research (IER) is a not-for-profit organization that conducts intensive research and analysis on the functions, operations, and government regulation of global energy markets. IER maintains that freely-functioning energy markets provide the most efficient and effective solutions to today's energy and environmental challenges and, as such, are critical to the well-being of individuals and society.

Founded in 1989 from a predecessor nonprofit organization, IER is a public foundation under Section 501(c)(3) of the Internal Revenue Code and is funded entirely by contributions from individuals, foundations and corporations. Headquartered in Washington, D.C., IER supports public policies that simultaneously promote the welfare of energy consumers, energy entrepreneurs, and taxpayers.

2. Robert P. Murphy Resumé: Robert Murphy earned his Ph.D. in economics from New York University in 2003. From 2003 – 2006 he taught economics at Hillsdale College. After three years of teaching, Murphy left academia for the private sector, taking a job with Laffer Investments, headed by Arthur Laffer. In this capacity, Murphy maintained and improved stock selection models, and also helped write research papers for clients. One of the Dr. Laffer's main interests in this period was oil prices.

In the summer of 2007 Murphy joined IER as an economist. His academic research has focused on climate change economics, specifically the proper discount rate to use when evaluating mitigation policies. He has also given several public

presentations on the oil industry, dealing with such issues as record oil prices, windfall profits taxes, and offshore drilling. In addition, Murphy has prepared studies for IER dealing with oil and food prices, the effects of ethanol on gasoline prices, and the role of institutional speculation in oil markets.

3. The Causes of Record Oil Prices: The American public is growing increasingly frustrated with record gasoline prices, compelling policy makers to determine their causes and, if possible, to implement measures that will attempt to bring relief. Below I quickly discuss three popular theories—“peak oil,” speculation, and the greed of “Big Oil”—that have been suggested as the cause of higher gasoline prices, but dismiss them because the data do not support these explanations. Afterwards I offer a more convincing explanation, namely that record oil prices are due to stagnant supply (caused by institutional restrictions on production), booming demand among developing economies, and a weak U.S. dollar.

a) “Peak Oil” Not Supported by the Data: Many analysts, most notably Matthew Simmons,¹ have argued that the world has reached its maximum rate of oil extraction, and that this physical scarcity is the ultimate cause for record oil prices. According to this viewpoint, in the long term oil prices have nowhere to go but up, because even as new deposits are found to replace existing ones as they are depleted, the new finds will impose higher recovery costs per barrel.

I reject the peak oil theory insofar as it refers to technological limits on human ingenuity. The world currently has over 1.3 trillion barrels of proven reserves of crude oil,² enough to last almost 43 years at the 2007 average world consumption rate.³ Yet this figure is misleading, because oil producers only have the incentive to locate additional oil deposits as the known reserves are depleted. At any given moment, a household only has, say, a month’s worth of groceries in the pantry, and a similar pattern holds true for world oil reserves. To illustrate this phenomenon, I note that in 1980, proven reserves were fewer than 645 billion barrels, which at that time represented 28 years’ worth of oil, given the prevailing rate of consumption.⁴ Many alarmists had declared the end of the fossil fuel era during the energy crises of the 1970s, but in the 28

years since 1980, the world has more than doubled its proven oil reserves, and in fact has discovered oil at a faster rate than its growth in annual consumption. This has increased the world's cushion of proven reserves from 28 to 43 years' worth of oil, calculated at the 1980 and 2007 rates of consumption.

I wish to emphasize that the "proven reserves" concept is not merely an engineering or geological one, but also an economic concept. Embedded in the definition is the requirement of a 90 percent probability that these barrels can be profitably brought to market, given known technologies and relevant market prices. If we broaden our definition to include deposits of petroleum that can more likely than not be brought to market, at some point in the future, with sufficient technological development, then the world currently has literally centuries' worth of oil resources available for exploitation, should the need arise.⁵

The peak oil theory, however, refers not to total reserves but rather to extraction rates, i.e. how many barrels of crude per day can be delivered to the market. Yet even here the evidence shows no reason for pessimism. It is true that average world output fell slightly from 84.6 million barrels per day in 2005 down to 84.5 million barrels in 2007. By itself, this fact appears to lend credence to the peak oil theory.

However, world output in the first quarter of 2008 averaged 85.6 million barrels per day, an all-time record. And even the stagnant total output from 2005 through 2007 is misleading, because OPEC nations reduced their output during this period to almost perfectly counterbalance increases from non-OPEC producers. In the first quarter of 2008, OPEC nations produced 36.8 million barrels per day, another all-time record high.⁶

In conclusion, the world currently has a record amount of proven oil reserves, and is extracting them at a record rate. It would be impossible to refute the peak oil theory any more decisively; what more can the oil market do, than break all previous records? It is true that supply growth has not kept pace with demand growth, and—to anticipate our later conclusions—this is the cause of record oil prices. But the constraints on supply are political, not technological or physical.

b) Speculators Not to Blame for Record Oil Prices: Many experts have recently testified before Congress on the role played by institutional investors, such as hedge and mutual funds, in the recent jump in oil prices.⁷ However, many economists argue that the data do not support this explanation. If oil prices were truly being held by as much as \$70 per barrel above the level justified by the fundamentals, then it follows that we would see a large surplus in the oil market. That is to say, at an overpricing of up to \$70 per barrel, producers would be delivering far more barrels to market than end users would be willing to purchase at such inflated prices.

Although it is possible for speculators to induce such an outcome, it would result in a growing supply of oil inventory. There is no such pattern in the data. According to the EIA, U.S. commercial stocks have moved within historic norms during the last two years.⁸ Faced with this awkward fact, those promulgating the speculator theory argue that OPEC producers have scaled back their output, in effect hoarding barrels under the sand, where they are not counted as part of inventories. Yet here too, the evidence does not fit the explanation. From the second quarter of 2007 through the present, OPEC output has steadily increased in every quarter, precisely when oil prices experienced their most rapid spike.⁹

c) “Big Oil” Greed Not the Cause of Record Prices: To many citizens, it seems that the ultimate explanation for high oil and gasoline prices is the greed of large oil companies. After all, they have been earning record profits precisely as citizens have been paying record prices.

In fact, the causality runs in the opposite direction. There are large upfront costs to explore for new oil and natural gas deposits, drill wells, and establish the additional infrastructure necessary to bring new product to market. As the market price of oil increases, some of the variable costs increase, but much of the total cost has already been sunk at that point. Therefore, profit margins are high during periods of high oil prices, and low during periods of low oil prices. The important point is that the price of oil is set by supply and demand on the world market. If—as many cynics apparently believe—oil executives truly had the power to arbitrarily set prices in order to achieve (astronomical) profit targets, why was the price of oil roughly \$31 back in 2003? The

desire for oil companies to earn large profits was surely as strong five years ago as it is today.

It is also relevant that the nine largest privately held oil companies control only 4 percent of the world's proven oil reserves; if anyone is to blame for high oil prices, it seems "Big Governments" are a more likely culprit than "Big Oil." A final observation on oil industry profits is that they are admittedly large in absolute terms, but this is because the sales volume is so large. In the first quarter of 2008, the major oil and natural gas companies earned 7.4 cents in net income per every dollar in sales. This is lower than the profit margin in some other industries, such as 25.9 cents in pharmaceuticals and medicines, 17.8 cents in beverages and tobacco products, and 7.6 cents per dollar in all manufacturing.¹⁰ Oil companies are earning record profits because their product is in very high demand, not because they are exploiting their customers.

In conclusion, the peak oil theory, the speculator theory, and the greed of "Big Oil" theory of record oil prices all have some supporting evidence, as well as glib proponents. But the balance of the evidence does not support these explanations. In the following sections I lay out a more straightforward story involving the more mundane issues of supply and demand, as well as the weakening U.S. dollar.

d) Stagnant Supply Coupled With Booming Demand Lead to Record Prices: Above I have summarized the facts on oil production. Although it is at record levels through the first quarter of 2008, earlier OPEC cutbacks had kept total world output roughly flat from 2005 through 2007.

During this period, oil consumption grew rapidly among developing countries, most notably China. From 2003 to 2007, China—the largest oil consumer in the world, after the United States—experienced an 8 percent annualized growth in its consumption of oil. Many commentators dismiss Chinese demand as an important factor, because after all, oil prices have certainly risen much more quickly than 8 percent per year. However, Chinese oil consumption has risen at such high levels *in spite of* more than a doubling of oil prices during this four-year period. (In contrast, Italy, Japan, and Germany all experienced greater than a 2 percent annual *decline* in oil consumption over this same four years, while the U.S. experienced a 0.8 percent annualized increase.)¹¹ In

order to gauge the actual shift in the Chinese appetite for oil, and its effects on the price of oil, one would need to estimate how quickly its consumption would have risen, had oil prices remained at their 2003 average of \$31 per barrel.

e) The Role of the Weakening U.S. Dollar: Oil is a highly fungible commodity traded on a world market. As such, changes in the exchange rate between the U.S. dollar and other currencies translate immediately into the spot price of crude, quoted in U.S. dollars. When the dollar falls against the euro, for example, the dollar-price of haircuts in Texas may not rise in response. But the dollar-price of a barrel of crude will, because oil can easily be diverted to other paying customers in response to fluctuating currency values.

From mid-June of 2007 through mid-June of 2008, the spot price of West Texas Intermediate crude rose from \$66 to \$135 per barrel, a 104 percent increase. But during the same period, the price of a euro rose from \$1.33 to \$1.54, almost a 16 percent increase. In this sense, fully 15 percent of the doubling of oil prices over the last year, is due entirely to the depreciation of the U.S. dollar against foreign currencies.

Beyond this direct linkage, some observers suggest that part of the recent boom in commodity prices is due to investor angst over future monetary policy. According to this view, oil prices have been driven not merely by the direct depreciation of the dollar, but also because investors are rushing to liquid commodities, such as oil and gold, in response to the credit crisis and the unprecedented interventions of the Federal Reserve. If an investor believes that the Fed and Treasury are willing to do whatever it takes to rescue ailing banks and a stagnant economy—despite year-over-year CPI increases of more than 5 percent—then a larger exposure to commodity indexes is a rational response.

The table below illustrates the strongest argument for this theory, namely that year-over-year oil prices were actually falling from January through August of 2007, and did not begin their meteoric ascent until the Federal Reserve cut its target rate in September.

Table 1
West Texas Intermediate Crude Spot Prices
(monthly averages, source: EIA ¹²)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006	65.49	61.63	62.69	69.44	70.84	70.95	74.41	73.04	63.80	58.89	59.08	61.96
2007	54.51	59.28	60.44	63.98	63.45	67.49	74.12	72.36	79.91	85.80	94.77	91.69
2008	92.97	95.39	105.45	112.58	125.40	133.88						

However, I should point out that this last argument is a variant of the speculative bubble theory. Because oil inventories (at least in the U.S.) have not grown significantly from September 2007 through the present, and because there appears to be no strategic cutback in oil production during this period, it is unlikely that a large portion of the sharp rise in oil prices in the last nine months can be attributed to investor anxiety over future economic conditions, because of the falling dollar or even a new war in the Middle East. Notwithstanding the evidence of Table 1 and the chronology of world events, I still maintain that fundamental forces are the true explanation of oil prices. However, my explanation includes the “fundamental” depreciation of the dollar which is not speculation, but a fact.

4. Possible Remedies for Record Oil Prices: In conclusion I list several possible remedies to bring down oil prices. I stress that these are not recommendations per se; there are possibly undesirable budgetary, macroeconomic, and environmental consequences for each of the remedies listed. My role as an economist is simply to inform the committee of its options. In the end, policy makers will have to weigh the benefits and costs of the following, as well as other, possible solutions to our present situation.

a) Enact Policies to Strengthen the U.S. Dollar: The long-term strength of the U.S. dollar is the responsibility of the Federal Reserve. If the goal were an appreciating dollar and correspondingly lower oil prices, the Fed would raise its target for the federal funds rate, which in turn would raise yields in general on dollar-denominated assets. If foreign investors believed the policy shift were permanent, they would increase their holdings of U.S. assets, driving up the dollar on the foreign exchanges. Besides Fed

policy, the federal government could also promote the dollar by cutting income tax rates, which would increase the after-tax return on U.S. assets and hence promote their attractiveness to investors. The Reagan tax cuts in the early 1980s went hand in hand with a soaring dollar.

b) Remove Federal Prohibitions on ANWR and OCS Oil Development, as Well as Oil Shale Leasing: According to federal government estimates, there are currently some 18 billion barrels in the Outer Continental Shelf (OCS),¹³ as well as an additional 19 billion barrels on federal lands,¹⁴ of crude oil resources that are off-limits to energy producers because of federal prohibitions. These numbers are likely to be extremely conservative, as producers have had little reason to explore without legal permission to develop these resources.

Besides actual prohibitions, there are also legal and other impediments brought by environmental groups and others to hinder development of oil resources on federal lands. Currently, less than 3 percent of the federal OCS is leased for energy exploration, and less than 6 percent of the onshore federal lands (over 2 billion acres), forcing exploration into a small fraction of our potential reserves.¹⁵ Government policies should seek to attract private capital to explore the government's lands to ascertain the extent of our resource potential, about which little is actually known.

Regarding oil shale, the Department of Energy estimates that the U.S. possesses some 800 billion barrels of recoverable oil,¹⁶ over three times the proven crude reserves of Saudi Arabia. However, current law forbids commercial leasing of this vast potential source of domestic energy, such that no commercial enterprise has the incentive to invest capital in this unconventional source.

Allowing the development of these domestic oil resources would not only increase world output of crude, but could significantly increase the world's spare pumping capacity, which members of industry argue is an important determinant of prices. For example, the EIA estimates 2008 spare capacity in OPEC producers at 1.55 million barrels per day.¹⁷ This is a very tight margin, where a major disruption to production anywhere in the world (Iran, Nigeria, Venezuela, etc.) could render supply unable to meet world demand. In this context, the mean estimated ANWR maximum

production rate of 780,000 barrels per day is more significant than many critics believe. (The low and high estimates of maximum ANWR production are 510,000 and 1.45 million barrels per day, respectively.)¹⁸

Finally, given the topic of today's hearing, I note that the connection between oil prices and the U.S. dollar is complex. Changes in the dollar's strength against other currencies are immediately reflected in the world price of oil, quoted in dollars, as explained earlier. However, to the extent that the United States increases domestic output and reduces its imports of foreign oil, a significant source of downward pressure on the dollar is weakened. Other things equal, removing federal restrictions on domestic oil production should lead to lower oil prices and a stronger dollar.

¹ Simmons, Matthew. *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*. Hoboken, N.J.: John Wiley & Sons, 2005.

² Proven reserves data available from the EIA at:

<http://www.eia.doe.gov/pub/international/iealf/crudeoilreserves.xls>. Data accessed on July 20, 2008.

³ The 2007 rate of world petroleum consumption available at: <http://www.eia.doe.gov/emeu/ipsr/t17.xls>. Accessed July 20, 2008.

⁴ The 1980 rate of world petroleum consumption available at: <http://www.eia.doe.gov/emeu/ipsr/t46.xls>. Accessed July 20, 2008.

⁵ Bradley, Jr., Robert and Richard Fulmer. *Energy: The Master Resource*. Dubuque, Iowa: Kendall/Hunt Publishing, 2004. Available online at: <http://www.instituteeforenergyresearch.org/2008/07/18/energy-the-master-resource/>.

⁶ Oil production rates available at: <http://www.eia.doe.gov/emeu/ipsr/t21.xls>. Accessed July 20, 2008.

⁷ See for example the testimony of hedge fund manager Michael Masters, available at:

http://hsgac.senate.gov/public/_files/052008Masters.pdf.

⁸ Commercial stock data available at: <http://tonto.eia.doe.gov/dnav/pet/hist/mtestus1m.htm>. Accessed July 20, 2008.

⁹ OPEC output data available at: <http://www.eia.doe.gov/emeu/ipsr/t21.xls>. Accessed July 20, 2008.

¹⁰ Earnings statistics from the American Petroleum Institute, available at:

http://api.org/statistics/earnings/upload/earnings_perspective.pdf. Accessed July 21, 2008.

¹¹ Data on 2003 and 2007 consumption available through the pull-down menu at:

<http://tonto.eia.doe.gov/country/index.cfm>. Accessed July 20, 2008.

¹² WTI spot prices available at: http://tonto.eia.doe.gov/dnav/pet/pet_pri_spt_s1_m.htm. Accessed July 21, 2008.

¹³ Data on OCS resources that are currently off-limits available at:

<http://www.eia.doe.gov/oiaf/aeo/otheranalysis/ongr.html>. Accessed July 21, 2008.

¹⁴ Data on crude resources located on off-limits onshore federal lands available at:

http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/EPCA_III/EPCA_III_faq.html. Accessed July 21, 2008.

¹⁵ Statistics on leased lands available at: <http://www.instituteeforenergyresearch.org/2008/06/25/truth-about-ocs/>.

¹⁶ Estimate of oil shale reserves at: <http://ostseis.anl.gov/guide/oilshale/index.cfm>. Accessed July 21, 2008.

¹⁷ EIA estimate of OPEC spare capacity available at: <http://www.eia.doe.gov/emeu/steo/pub/3ctab.pdf>. Accessed July 21, 2008.

¹⁸ Estimates of ANWR production rates available at:

<http://www.eia.doe.gov/oiaf/servicerpt/anwr/results.html>. Accessed July 21, 2008.